



# CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

An ISO 9001:2008 Certified Company



JobNo: CTCE/BBMP/WNo.10/RC/WMM/Gradation/2012-13



23.02.2013

## GRADATION FOR WMM MORTH TABLE-400-11

**Client** : Asst. Executive Engineer, Vidyaranyapura Sub Division, BBMP, Bangalore.

**Agency** : Mr. R. Chandranaik, Contractor, Bangalore.

**Name of Work** : Metalling and Asphalting to Roads in Kalappa Layout in Ward No. 10, Doddaabommasandra, BBMP, Bangalore.

**Reference** : AEE/Vidyaranyapura/PR/407/1/2012-13 Dated: 21.02.2013

**Date of Testing** : 23.02.2013

**Material** : WMM

**Sample Location** : WMM Mix Plant

**Oven Dry Wt (gm):** 11015

| Is Sieve Size in mm | Weight Retained (gm) | Cumulative Weight Retained (gm) | Cumulative % of Retained | Cumulative % of Passing | Spec.Limits |
|---------------------|----------------------|---------------------------------|--------------------------|-------------------------|-------------|
| 53                  | 0                    | 0                               | 0                        | 100                     | 100         |
| 45                  | 415                  | 415                             | 3.8                      | 96.2                    | 95-100      |
| 22.4                | 2910                 | 3325                            | 30.2                     | 69.8                    | 60-80       |
| 11.2                | 2240                 | 5565                            | 50.5                     | 49.5                    | 40-60       |
| 4.75                | 1530                 | 7095                            | 64.4                     | 35.6                    | 25-40       |
| 2.36                | 1480                 | 8575                            | 77.8                     | 22.2                    | 15-30       |
| 0.600               | 1260                 | 9835                            | 89.3                     | 10.7                    | 8-22        |
| 0.075               | 870                  | 10705                           | 97.2                     | 2.8                     | 0-8         |

Information is furnished by the Agency.

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*23/2/13*

Assistant Executive Engineer  
Vidyaranyapura Sub Division  
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*Ganesh*  
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JobNo: CTCE/BBMP/WNo.10/RC/WMM/AIV/2012-13



23.02.2013

## Aggregate Impact Value

IS: 2386 Part IV

|                   |                                                                                                          |
|-------------------|----------------------------------------------------------------------------------------------------------|
| Client            | Asst. Executive Engineer, Vidyaranyapura Sub Division, BBMP, Bangalore.                                  |
| Agency            | Mr. R. Chandranaik, Contractor, Bangalore.                                                               |
| Name of the Work  | Metalling and Asphaltting to Roads in Kalappa Layout in Ward No. 10, Doddaabommasandra, BBMP, Bangalore. |
| Reference         | AEE/Vidyaranyapura/PR/407/1/2012-13 Dated: 21.02.2013                                                    |
| Source / Location | WMM Plant                                                                                                |
| Type of Mix       | Wet Mix macadam                                                                                          |
| Date of Testing   | 23.02.2013                                                                                               |

| Sl No. | Details                                                                    | Trial No. |       |       | Average |
|--------|----------------------------------------------------------------------------|-----------|-------|-------|---------|
|        |                                                                            | 1         | 2     | 3     |         |
| 1      | Total weight of aggregate sample filling the cylindrical measure = $W_1$ g | 372       | 368   | 384   | 22.15   |
| 2      | Weight of aggregate passing 2.36 mm sieve after the test = $W_2$ g         | 81        | 83    | 85    |         |
| 3      | Weight of aggregate retained 2.36 mm sieve after the test = $W_3$ g        | 291       | 285   | 299   |         |
| 4      | Aggregate Impact value = percent fines                                     | 21.77     | 22.55 | 22.14 |         |
|        | $100 * (W_2/W_1) \%$                                                       |           |       |       | 22.15   |

### Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

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ವಿದ್ಯಾರಣ್ಯಪುರ ಉಪ ವಿಭಾಗ  
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# CIVIL-TECH CONSULTANTS AND ENGINEERS

An ISO 9001:2008 Certified Company

(Building, Geo-Tech & High way Material Testing Research Laboratory)

Engineering Project Consultants



JobNo: CTCE/BBMP/WNo.10/RC/WMM/Shape.T/2012-13

: 23.02.2013

## DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client : Asst. Executive Engineer, Vidyaranyapura Sub Division, BBMP, Bangalore.  
 Agency : Mr. R. Chandranai, Contractor, Bangalore.  
 Name of Work : Metalling and Asphalting to Roads in Kalappa Layout in Ward No. 10, Doddaabommasandra, BBMP, Bangalore.  
 Refrence : AEE/Vidyaranyapura/PR/407/1/2012-13 Dated: 21.02.2013  
 Technical Reference : IS 2386(Part 1) 1963 (RA 2007)  
 Type of Mix : Wet Mix Macadam  
 Date of Testing : 23.02.2013



| Passing through IS Sieve, mm | Retained On IS Sieve, mm | Weight of Sieved Fraction (W) gms |      | Proportion of Size range in the sample, $X = 100 \times W / \Sigma W$ |       | Weight of 200 pieces of aggregates of the range, (P) in gms |      | Thickness gauge size, mm | Weight of flaky particles (F) in gms |     | Percentage by Weight of flaky aggregates in gms $Y = 100 \times F / P$ | Weighted Percentage of flaky aggregates in gms $XY = X \times Y$ | Weight of fraction consisting of at least 200 Pieces in gms |        | Length gauge size in mm | Weight of aggregates in each fraction retained on Length gauge in |     |
|------------------------------|--------------------------|-----------------------------------|------|-----------------------------------------------------------------------|-------|-------------------------------------------------------------|------|--------------------------|--------------------------------------|-----|------------------------------------------------------------------------|------------------------------------------------------------------|-------------------------------------------------------------|--------|-------------------------|-------------------------------------------------------------------|-----|
| 63.00                        | 50.00                    | W1                                |      | X1                                                                    |       | P1                                                          |      | 33.90                    | F1                                   |     |                                                                        |                                                                  | P1                                                          |        | -                       | E1                                                                |     |
| 50.00                        | 40.00                    | W2                                | 2923 | X2                                                                    | 20.98 | P2                                                          | 2821 | 27.00                    | F2                                   | 456 | 16.16                                                                  | 339.07                                                           | P2                                                          | 2821.0 | 81.00                   | E2                                                                | 265 |
| 40.00                        | 31.50                    | W3                                | 2632 | X3                                                                    | 18.89 | P3                                                          | 2568 | 21.50                    | F3                                   | 348 | 13.55                                                                  | 255.95                                                           | P3                                                          | 2568.0 | 64.40                   | E3                                                                | 249 |
| 31.50                        | 25.00                    | W4                                | 2414 | X4                                                                    | 17.32 | P4                                                          | 2323 | 16.95                    | F4                                   | 283 | 12.18                                                                  | 211.04                                                           | P4                                                          | -      | -                       | E4                                                                | -   |
| 25.00                        | 20.00                    | W5                                | 1986 | X5                                                                    | 14.25 | P5                                                          | 1842 | 13.50                    | F5                                   | 262 | 14.22                                                                  | 202.71                                                           | P5                                                          | 1842.0 | 40.50                   | E5                                                                | 191 |
| 20.00                        | 16.00                    | W6                                | 1621 | X6                                                                    | 11.63 | P6                                                          | 1514 | 10.80                    | F6                                   | 231 | 15.26                                                                  | 177.49                                                           | P6                                                          | 1514.0 | 32.40                   | E6                                                                | 167 |
| 16.00                        | 12.50                    | W7                                | 1337 | X7                                                                    | 9.59  | P7                                                          | 1288 | 8.55                     | F7                                   | 97  | 7.53                                                                   | 72.26                                                            | P7                                                          | 1288.0 | 25.60                   | E7                                                                | 161 |
| 12.50                        | 10.00                    | W8                                | 674  | X8                                                                    | 4.84  | P8                                                          | 571  | 6.75                     | F8                                   | 81  | 14.19                                                                  | 68.61                                                            | P8                                                          | 571.0  | 20.20                   | E8                                                                | 98  |
| 10.00                        | 6.30                     | W9                                | 348  | X9                                                                    | 2.50  | P9                                                          | 289  | 4.89                     | F9                                   | 67  | 23.18                                                                  | 57.90                                                            | P9                                                          | 289.0  | 14.70                   | E9                                                                | 86  |
|                              |                          | $\Sigma W$ 13935.0                |      |                                                                       |       |                                                             |      |                          |                                      |     | $\Sigma XY$ 1385.03                                                    |                                                                  | $\Sigma P$ 10893.0                                          |        |                         | $\Sigma E$ 1217.0                                                 |     |

Result : Flakiness Index = 13.85%

Elongation Index = 11.17%

Result : Combined Flakiness & Elongation index

25.02%

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JobNo: CTCE/BBMP/WNo.10/RC/WMM/AL/2012-13



23.02.2013

## ATTERBERG LIMITS TEST FOR WMM MORTH TABLE-400-13

**Client** : Asst. Executive Engineer, Vidyaranyapura Sub Division, BBMP, Bangalore.

**Agency** : Mr. R. Chandranaik, Contractor, Bangalore.

**Name of Work** : Metalling and Asphaltting to Roads in Kalappa Layout in Ward No. 10, Doddaabommasandra, BBMP, Bangalore.

**Reference** : AEE/Vidyaranyapura/PR/407/1/2012-13 Dated: 21.02.2013

**Date of Testing** : 23.02.2013

**Material** : WMM

**Sample Location** : WMM Mix Plant

As per MORTH Table 400-13

| Sl. No. | Particulars         | Test Results | Standards as per Specifications |
|---------|---------------------|--------------|---------------------------------|
| 1       | Liquid Limit, %     | 23.10        | 25.0% Maximum.                  |
| 2       | Plasticity Index, % | Non Plastic  | 6.0% Maximum.                   |

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Job No.: CTCE/BBMP/WNo.10/RC/SDBC/Bitumen/2012-13

07.03.2013

## BITUMEN CONTENT AND GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

### AASHTO T 164 & AASHTO T 30

|                  |                                                                                                          |
|------------------|----------------------------------------------------------------------------------------------------------|
| CLIENT           | Asst. Executive Engineer, Vidyaranyapura Sub Division, BBMP, Bangalore.                                  |
| AGENCY           | Mr. R. Chandranaik, Contractor, Bangalore.                                                               |
| NAME OF THE WORK | Metalling and Asphaltting to Roads in Kalappa Layout in Ward No. 10, Doddaabommasandra, BBMP, Bangalore. |
| REFERENCE        | AEE/Vidyaranyapura/PR/407/1/2012-13 Dated: 21.02.2013                                                    |
| SAMPLE I/D       | Roads in Kalappa Layout, Ward No. 10.                                                                    |
| DATE OF TESTING  | 07.03.2013                                                                                               |



### BITUMEN CONTENT DETERMINATION

| Description                                          | Trail 1 | Trail 2 |
|------------------------------------------------------|---------|---------|
| 1. Weight of Mixture before Test, g                  | 500     | 500     |
| 2. Weight of Mixture after Test, g                   | 474.5   | 475.5   |
| 3. Weight of Asphalt and Mineral matter Extracted, g | -       | -       |
| 4. Weight of Mineral Matter, g.                      | -       | -       |
| 5. Weight of Ash, g                                  |         |         |
| 6. Weight of Bitumen Extracted, g. (corrected)       | 25.5    | 24.50   |
| 7. Bitumen content in %                              | 5.10    | 4.90    |
| 8. Average                                           | 5.00    |         |



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Job No.: CTCE/BBMP/WNo.10/RC/SDBC/Gradation/2012-13

07.03.2013

## BITUMEN CONTENT AND GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

## AASHTO T 164 & AASHTO T 30

|                         |                                                                                                          |
|-------------------------|----------------------------------------------------------------------------------------------------------|
| <b>CLIENT</b>           | <b>Asst. Executive Engineer,</b> Vidyaranyapura Sub Division, BBMP, Bangalore.                           |
| <b>AGENCY</b>           | <b>Mr. R. Chandranaik,</b> Contractor, Bangalore.                                                        |
| <b>NAME OF THE WORK</b> | Metalling and Asphaltting to Roads in Kalappa Layout in Ward No. 10, Doddaabommasandra, BBMP, Bangalore. |
| <b>REFERENCE</b>        | AEE/Vidyaranyapura/PR/407/1/2012-13 Dated: 21.02.2013                                                    |
| <b>SAMPLE I/D</b>       | Roads in Kalappa Layout, Ward No. 10.                                                                    |
| <b>DATE OF TESTING</b>  | 07.03.2013                                                                                               |



### GRADATION AFTER EXTRACTION

| SIEVE SIZE | Trail 1             |            |                       |           | JOBMIX    |
|------------|---------------------|------------|-----------------------|-----------|-----------|
| mm         | Weight Retained, gm | % Retained | %Cummulative Retained | % Passing | Gradation |
| 13.2       | 0                   | 0          | 0                     | 100       | 100       |
| 9.5        | 21.39               | 4.51       | 4.51                  | 95.49     | 90-100    |
| 4.75       | 250.27              | 52.74      | 57.25                 | 42.75     | 35-51     |
| 2.36       | 50.13               | 10.56      | 67.82                 | 32.18     | 24-39     |
| 1.18       | 46.59               | 9.82       | 77.64                 | 22.36     | 15-30     |
| 0.3        | 38.47               | 8.11       | 85.74                 | 14.26     | 9-19      |
| 0.075      | 32.13               | 6.77       | 92.51                 | 7.49      | 3-8       |

| SIEVE SIZE | Trail 2             |            |                       |           | JOBMIX    |
|------------|---------------------|------------|-----------------------|-----------|-----------|
| mm         | Weight Retained, gm | % Retained | %Cummulative Retained | % Passing | Gradation |
| 13.2       | 0                   | 0          | 0                     | 100       | 100       |
| 9.5        | 22.18               | 4.66       | 4.66                  | 95.34     | 90-100    |
| 4.75       | 241.63              | 50.82      | 55.48                 | 44.52     | 35-51     |
| 2.36       | 56.89               | 11.96      | 67.44                 | 32.56     | 24-39     |
| 1.18       | 53.17               | 11.18      | 78.63                 | 21.37     | 15-30     |
| 0.3        | 46.98               | 9.88       | 88.51                 | 11.49     | 9-19      |
| 0.075      | 24.21               | 5.09       | 93.60                 | 6.40      | 3-8       |

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